negatively on the biodiversity elements conserved. It may be appropriate to use some land to swop for areas with higher priority in terms of biodiversity and ecological infrastructure. In view of the implications of climate change, it will be wise to consolidate land and to provide corridors where possible. Catchments of major dams should be managed to optimise water quality and sustained run off and provide opportunities for biodiversity conservation. Land that supports under-protected biodiversity elements should be acquired or secured. Various kinds of partnerships should be explored, especially where geographically appropriate or where land that is particularly valuable from a biodiversity perspective is privately owned. Rarity and sustaining populations of large mammals like elephant, rhino and lions, should be considered as well as threat status. Desired conservation targets as defined in international agreements and conventions must also be taken into account. In Mpumalanga, provincial protected area targets as well as biodiversity targets indicate that more land needs to be protected. Land should be classified according to its value for biodiversity conservation, environmental education, water catchment, carbon sequestration and tourism potential - some land may be held specifically to generate revenue in order to cross-subsidise areas with high biodiversity value.

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The initial response of Frithia humilis Burgoyne, an endangered edaphic specialist, translocated to non-typical geologies

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Frithia humilis is an endangered succulent threatened by coal mining in the Mpumalanga grasslands. This endemic species is an edaphic specialist, preferring sandstone outcrops of the Ecca and Dwyka Groups (Karoo Supergroup). One severely threatened population was translocated to three geologically distinct habitats, only one of which corresponds to the origin. A monitoring programme was launched in 2010 to track the post-translocation progress of the populations, as well as to assess the viability of translocation to atypical geologies. Although translocation success can generally only be gauged after decades of monitoring, this study aimed to monitor the initial response of the translocated population to different habitats, by measuring 'vital signs': survival, individual plant growth and fecundity. Population age structure and flowering was measured, and censuses were conducted biannually, with demographic data gathered per 1 m^2 according to relative age (number of leaves per plant) and flower production. Age structure of the translocated populations was compared to trends observed in a natural, benchmark population. Repeated Measures Analysis of Variance (ANOVA) was applied to determine significant variance in age structure and flowering between populations. The two populations that were translocated to foreign geologies showed a 30-45% decline of individuals over time, indicating population deterioration. The population on Ecca and Dwyka geologies is expanding: population growth was 13.47% over three years. Flowering in all translocated populations had increased significantly over time, boosting reproductive potential. As one of the first translocation projects of its kind in South Africa, these early responses of populations to different geologies can inform the potential of future efforts to relocate edaphic specialists of the Mesembryanthemaceae.

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A new record of rodent pollination in the holoparasitic genus *Cytinus*

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The enigmatic root-holoparasitic genus *Cytinus* occurs in the Mediterranean (2 monoecious species), South Africa (3 dioecious species), and Madagascar (1 dioecious species). Pollination by insects has been documented in the Mediterranean *C. hypocistis*, and by rodents and elephant shrews in the recently described South African species *C. visseri*, which is found in the grasslands of the Mpumalanga province. Flowers of the Western Cape species *Cytinus sanguineus* appear adapted to bird pollination as they are bright scarlet, scentless, and produce copious nectar in open, easily accessible flowers. By contrast, flowers of the other Cape species, *Cytinus capensis*, are dark maroon and remain tightly closed throughout their life. The discovery of a large population of plants tentatively identified as *C. capensis* despite this population's occurrence outside the known distribution range of this species, the Cape Peninsula, enabled us to carry out detailed pollination studies. Motion-sensor camera recordings revealed visitation exclusively by nocturnal rodents, which are attracted by the strong, vanilla-like scent of flowers and feed on nectar. Rodents access the copious nectar by pushing down individual petals along pre-formed hinges, and transfer pollen on the fur around their snouts. Insects do not visit the flowers. We compare aspects of the reproductive biology of this *Cytinus* species with others in the genus.

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Ant-repelling pollinators: Unique pollination strategy of the ant-plant *Macaranga* (Euphorbiaceae)

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In the tropics, some plants known as ant-plants have tight mutualistic relationships with ants. These plants offer food, such as extrafloral nectar and food-bodies, for symbiotic ants. In turn, the ants protect the plants by excluding herbivores. On flowers, however, the plants often face a conflict when ants exclude not only herbivores but also pollinators. In this study, we investigated how this conflict is addressed in the genus *Macaranga* (Euphorbiaceae). *Macaranga* includes approximately 30 ant-plant species that are inhabited by species-specific *Crematogaster* ants. They are pollinated by thrips *Dolichothrips* spp., tiny insects that are 2–3 mm in length. The thrips feed on nectaries on bracteoles and breed on the inflorescences of *Macaranga*. To investigate whether the ants deter pollination, we excluded ants from inflorescences and compared the number of thrips to control inflorescences. The number of thrips did not differ between ant-excluded and control inflorescences. We observed pollinator thrips secreting liquid from their anus and conducted bioassays to determine if chemical substances secreted by pollinator thrips function as ant repellents. Ants were brought into contact with individual thrips or 5 mm Teflon rods on which hexane (control), thrip anal secretions, or decanoic acid (a chemical found in the secretions) were applied. Ants were deterred more often by thrips than from controls, especially when the thrips raised their abdomens. The ants also retreated more often from thrip secretions and decanoic acid than from the controls. These results suggest that the plants avoid pollination deterrence by ants by being pollinated by ant-repelling